# Servo & GStreamer

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# Servo

Servo is a modern, high-performance browser engine designed for both application and embedded use.

https://github.com/servo/servo/

GitHub workflow

# Rust

- zero-cost abstractions
- move semantics
- guaranteed memory safety
- threads without data races
- trait-based generics
- pattern matching
- type inference
- minimal runtime
- efficient C bindings

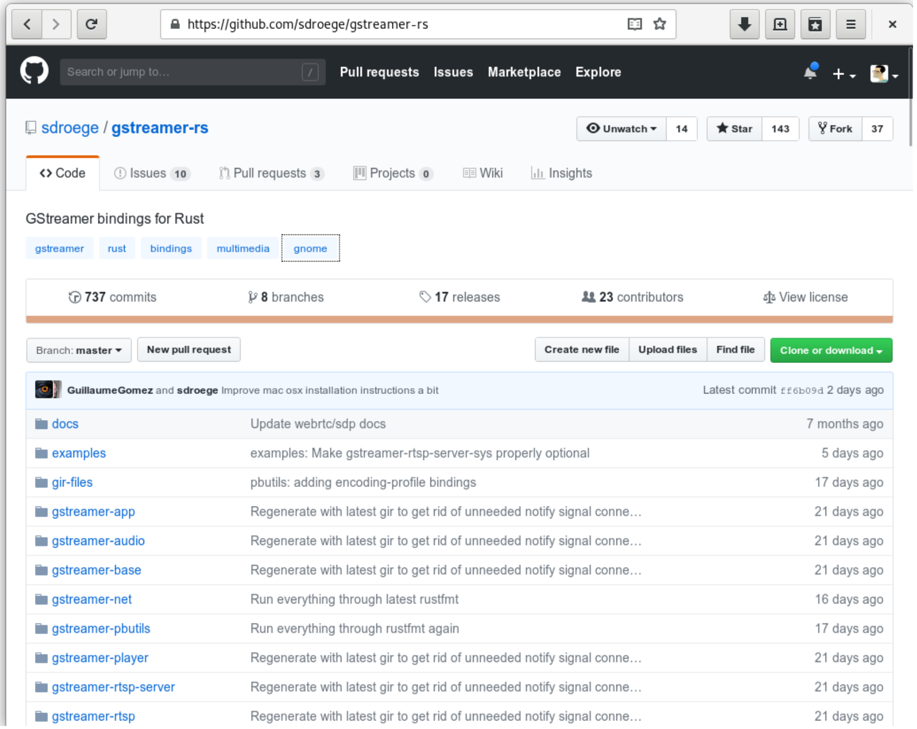
# Servo/Media Crate

- Abstraction Layer for media operations
  - **Audio** package for WebAudio
  - **Player** package for `<audio>` and `<video>`
  - Backends:
    - **GStreamer** (through gstreamer-rs)

- https://github.com/servo/media

# gstreamer-rs

- GStreamer bindings for Rust
    - GitHub workflow (for now...)



GStreamer bindings for Rust

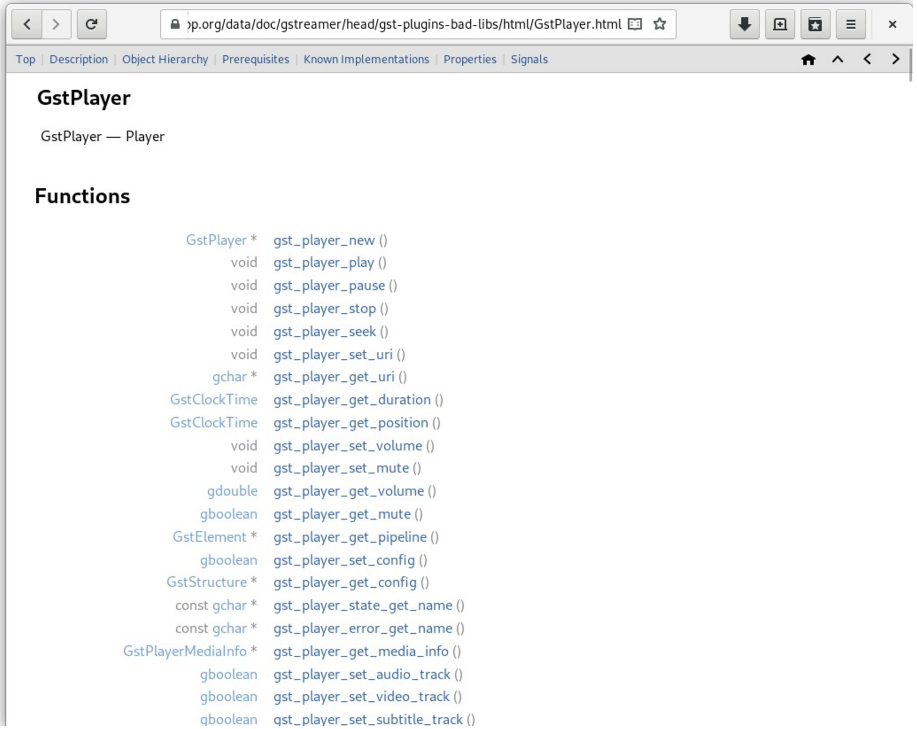
GuillaumeGomez and sdroege Improve mac osx installation instructions a bit — Latest commit ff6b09d 2 days ago

| | | |
|---|---|---|
| docs | Update webrtc/sdp docs | 7 months ago |
| examples | examples: Make gstreamer-rtsp-server-sys properly optional | 5 days ago |
| gir-files | pbutils: adding encoding-profile bindings | 17 days ago |
| gstreamer-app | Regenerate with latest gir to get rid of unneeded notify signal conne… | 21 days ago |
| gstreamer-audio | Regenerate with latest gir to get rid of unneeded notify signal conne… | 21 days ago |
| gstreamer-base | Regenerate with latest gir to get rid of unneeded notify signal conne… | 21 days ago |
| gstreamer-net | Run everything through latest rustfmt | 16 days ago |
| gstreamer-pbutils | Run everything through rustfmt again | 17 days ago |
| gstreamer-player | Regenerate with latest gir to get rid of unneeded notify signal conne… | 21 days ago |
| gstreamer-rtsp-server | Regenerate with latest gir to get rid of unneeded notify signal conne… | 21 days ago |
| gstreamer-rtsp | Regenerate with latest gir to get rid of unneeded notify signal conne… | 21 days ago |

https://github.com/sdroege/gstreamer-rs/

# Servo/Media Player Backend

- It uses GstPlayer API
  - In gst-plugins-bad (for now)
  - Convenience API for A/V playback



ɔp.org/data/doc/gstreamer/head/gst-plugins-bad-libs/html/GstPlayer.html
Top | Description | Object Hierarchy | Prerequisites | Known Implementations | Properties | Signals

## GstPlayer

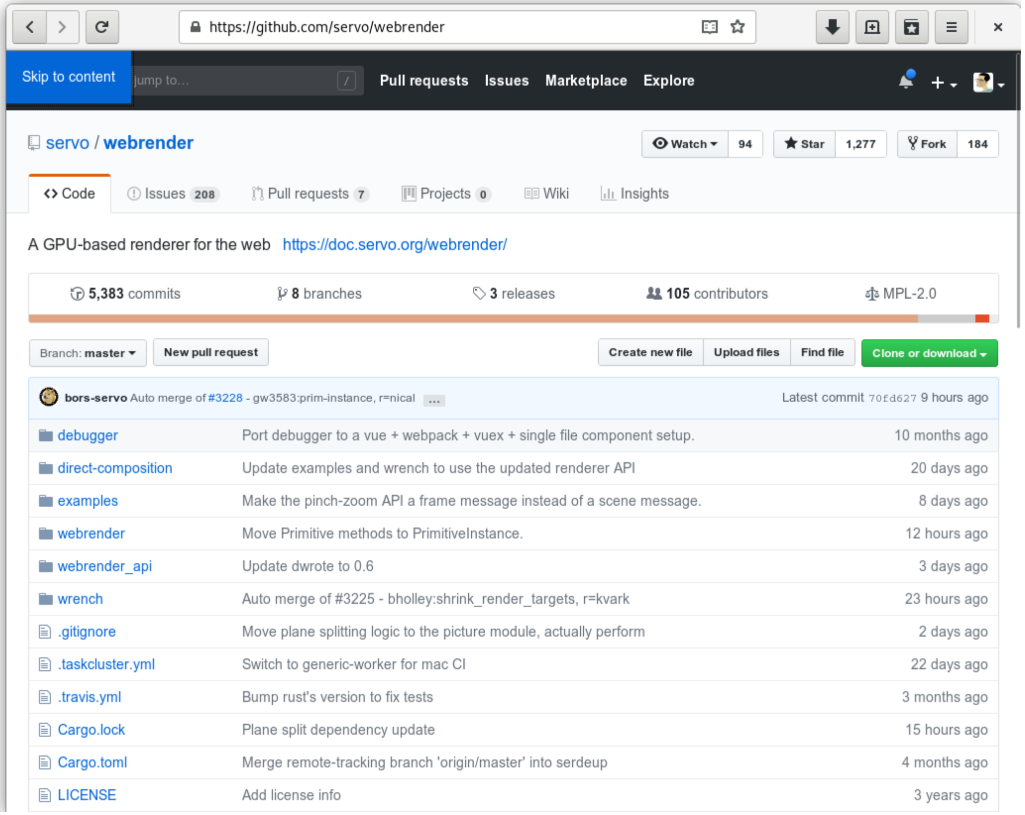
GstPlayer — Player

### Functions

| | |
|---|---|
| GstPlayer * | gst_player_new () |
| void | gst_player_play () |
| void | gst_player_pause () |
| void | gst_player_stop () |
| void | gst_player_seek () |
| void | gst_player_set_uri () |
| gchar * | gst_player_get_uri () |
| GstClockTime | gst_player_get_duration () |
| GstClockTime | gst_player_get_position () |
| void | gst_player_set_volume () |
| void | gst_player_set_mute () |
| gdouble | gst_player_get_volume () |
| gboolean | gst_player_get_mute () |
| GstElement * | gst_player_get_pipeline () |
| gboolean | gst_player_set_config () |
| GstStructure * | gst_player_get_config () |
| const gchar * | gst_player_state_get_name () |
| const gchar * | gst_player_error_get_name () |
| GstPlayerMediaInfo * | gst_player_get_media_info () |
| gboolean | gst_player_set_audio_track () |
| gboolean | gst_player_set_video_track () |
| gboolean | gst_player_set_subtitle_track () |

# WebRender

- A GPU based renderer for the Servo
- It paints the frames (images or textures)



A GPU-based renderer for the web https://doc.servo.org/webrender/

5,383 commits · 8 branches · 3 releases · 105 contributors · MPL-2.0

bors-servo Auto merge of #3228 - gw3583:prim-instance, r=nical … Latest commit 70fd627 9 hours ago

| | | |
|---|---|---|
| debugger | Port debugger to a vue + webpack + vuex + single file component setup. | 10 months ago |
| direct-composition | Update examples and wrench to use the updated renderer API | 20 days ago |
| examples | Make the pinch-zoom API a frame message instead of a scene message. | 8 days ago |
| webrender | Move Primitive methods to PrimitiveInstance. | 12 hours ago |
| webrender_api | Update dwrote to 0.6 | 3 days ago |
| wrench | Auto merge of #3225 - bholley:shrink_render_targets, r=kvark | 23 hours ago |
| .gitignore | Move plane splitting logic to the picture module, actually perform | 2 days ago |
| .taskcluster.yml | Switch to generic-worker for mac CI | 22 days ago |
| .travis.yml | Bump rust's version to fix tests | 3 months ago |
| Cargo.lock | Plane split dependency update | 15 hours ago |
| Cargo.toml | Merge remote-tracking branch 'origin/master' into serdeup | 4 months ago |
| LICENSE | Add license info | 3 years ago |

# Player Current status

- It works! *:)*
  - Simple A/V playback
  - WebRender paints frames as images

# Work in Progress

- Seeking (almost merged)
- Hardware acceleration
- Zero copy (as much as possible)

# Hardware acceleration

- Hardware acceleration decoding depends on the supported and installed elements
  - OMX
  - V4L
  - VA-API
  - ...

# Zero copy (or almost)

- GStreamer should deliver GL textures
  - Some of those decoders may produce EGL images or DMAbufs (OMX, VA-API)
  - Upload them into the GL context using
    `{ glupload ! glconvert ! appsink }`
  - WebRender will render them as composited textures

# gstreamer-gl

- Add bindings for GstGL API
  - gstreamer-gl in gstreamer-sys ✓
    - No GL API exposing
  - gstreamer-gl in gstreamer-rs
    - EGL / GLX / Wayland support as compilation defined features (dependencies)

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